COEXISTING CHALCOPHILE AND LITHOPHILE URANIUM IN QINGZHEN (EH3) CHONDRITE

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Mineralogical and textural studies of Qingzhen have shown that it is highly unequilibrated and that it contains a population of chondrules and isolated enstatite grains which preserve the record of more oxidizing nebular conditions (Rambaldi *et al.*, 1983, 1984). Even though in the majority of cases these objects have been affected by various degrees of reduction, some still contain silicates with high (up to 10%) FeO contents. The discovery of oxidized materials within an otherwise reduced meteorite, makes it an interesting candidate for U-distribution studies. Previous work by Murrell and Burnett (1982) has shown that in the EL6 chondrites oldhamite (CaS) accounts for more than 80% of the total U content, while in the EH4 chondrite, Abee both oldhamite and niningerite (MgS) are important U-bearing phases.

Five polished sections of Qingzhen were irradiated and the U-bearing phases identified using the fission track technique. Mean U concentrations of 300 $\pm$ 20 ppb were found in oldhamite, which compare well with the value of 260 $\pm$ 20 ppb found in Abee oldhamite. Niningerite in Qingzhen contains only $\simeq$ 2 ppb U in contrast to Abee niningerite (45 ppm). This is probably the result of considerable chemical differences in the composition of this mineral in the two meteorites. For example, in the case of Ca, its abundance in the Qingzhen niningerite (0.5%) is a factor of six lower than that from Abee (Rubin and Keil, 1983). No U (< 1 ppb) was found in the K-bearing sulfide, djerfisherite.

We have identified several chondrules in Qingzhen which contain large 50-100 μm areas of mesostasis which have high U contents. Similar U enrichments in chondrule mesostasis have been found in ordinary chondrites (Murrell and Burnett, 1983).

Chondrule A is a porphyritic chondrule consisting mainly of enstatite and interstitial albitic glass plus minor amounts of troilite, oldhamite, niningerite and metal. The glass in the chondrule core contains crystallites of a Ca,Al and Ti-rich pyroxene, which appear to be the site of high U concentrations (140 ppb). On the other hand in the outer portion of the chondrule, the glass is devoid of pyroxene crystallites and Ca is predominantly present as large isolated oldhamite grains with $\simeq$ 300 ppb U. The presence of U-bearing Ca-pyroxene suggests that the precursor material of chondrule A must have originated under more oxidizing and less sulfurizing conditions than the bulk Qingzhen. Subsequently, the material was probably transported into a reducing environment where it was mixed with CaS and other sulfides prior to the melting involved in the chondrule formation event.

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THE CIRCULAR STRUCTURE AT GLOVER BLUFF: WHAT AND WHERE IT IS

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Since the lower Ordovician dolomite exposed at Glover Bluff contains shatter cones, it is assumed that we are dealing here with a poorly exposed impact structure. The dolomite has been dropped down a couple of hundred feet. Two mechanisms for dropping down are commonly evident in impact structures: slumping in the walls of craters, peripheral downwarping or down-faulting in crater substructures. A fair number of water wells have been drilled down to bedrock around the Bluff. In almost all of these, the first — usually the only — bedrock encountered was sandstone. There is no circular belt of concealed dolomite extending beyond the Bluff. So slumping in the side of a crater appears in this case to be the better bet.

A conglomerate between the dolomite and underlying Cambrian sandstone contains as much material derived from the rock above as from the rock below. It can reasonably be explained as the product of friction between a downsliding slab and less well indurated material beneath it.